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OF THE

TORREY BOTANICAL CLUB

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Errata

Page 43, line 12, *for* Report. *read* Repert.

Page 96, line 2, *for* not *read* nor.

Page 136, line 13, *for* mount *read* amount.

Page 136, lines 24, 25, and page 137, line 9, *for* colorometric *read* colorimetric.

Page 224, line 11, *for* 45 *read* 40.

Page 225, line 2 from below (in footnote), *for* have not *read* not have.

Page 288, line 12 from below, for *Cladoniar angiferina* read *Cladonia rangiferina*.

Page 289, line 11, for *Philophorus* read *Pilophorus*.

Page 308, line 3, for *rudicaula* read *nudicaule*.

Page 333, line 27, *for* Islands *read* Island.

Page 334, line 19, *for* W. G. Hannibal *read* W. H. Hannibal.

Page 334, line 6 from below, *for* Annie R. Laws *read* Annie E. Laws.

Page 335, line of explanation under table, *for* × not common *read* × not uncommon.

Page 340, first line of footnotes, for *Astropadsis* read *Astrodapsis*, and *for* and other characteristic *read* and characteristic.

Page 372, line 28, *for* Tampico *read* Jacksonville, Tampa.

Pages 426–431, 435, 438, various lines, for *alleghaniensis* read *allegheniensis*.

Page 515, line 5, *for* Withlacooche *read* Withlacoochee.

Vol. 38 No. 1

BULLETIN

OF THE

TORREY BOTANICAL CLUB

JANUARY, 1911

Further notes on the stemless violets of the South

EZRA BRAINERD

(WITH PLATE 1)

In the preceding paper* the *palmata* group of blue stemless violets was discussed. Next to these in Dr. Small's Flora of the Southeastern United States comes the *affinis* group, consisting of three closely allied species, growing in wet soil. They are characterized by glabrous foliage, and cleistogamous flowers on ascending peduncles that elongate and bear ellipsoid capsules, more or less tinged or dotted with purple.

VIOLA AFFINIS proves to be a widespread and somewhat variable species. The most marked variation is the pubescent capsule, seen in New England specimens only from Wellesley, Mass., but often in specimens from the Middle States, and collected as far south as Mt. Vernon, Va. This character appears in no other species of our stemless violets, though found in several of the stemmed violets: *V. pubescens*, *V. scabriuscula*, and *V. canadensis*. In all cases it is an inconstant character, being often absent in associated plants otherwise identical.

In the South I collected *Viola affinis* at Summerville, S. C., and found it abundant at Biltmore, N. C. From West Nashville, Tenn., Mr. W. W. Eggleston sent me live plants, that I place here, after growing them for two seasons; though they are somewhat larger than normal in leaf, capsule, and seed.

Specimens of VIOLA LANGLOISII Greene of eastern Louisiana and Texas are not easily distinguished from specimens of *V. affinis*

*37: 581–590. 11 Ja 1911.

[The BULLETIN for December, 1910 (37: 569–630. *pl. 36*) was issued 11 Ja 1911.]

of the North, if one does not know from which region they came. For five seasons the southern plant has been growing out of doors in Vermont, with no winter protection but a covering of leaves; and though not perfectly hardy, and not flowering freely in the spring, yet aside from an indefinable something in its general aspect, I can differentiate it from *V. affinis* by no better earmark than the much greater length of the auricles of the sepals.

However, the southern plant develops a variety with lobed leaves, such as is never found in connection with its northern relative. This in my recent distribution of the violets of eastern North America I have named: *Viola Langloisii* Greene, var. **pedatiloba**, var. nov. As in *V. esculenta*, the lobed leaves are preceded in early spring and followed in late summer by the ordinary uncut leaves.

VIOLA CHALCOSPERMA, the new species of this group from Florida, has the same heterophyllous character, and the same habitat—low tracts often flooded, along sluggish streams.

The third and last group of blue stemless violets in the South may be represented by *Viola cucullata* and *V. sagittata*, and consists of eight species. The group is marked by having subulate or sagittate cleistogamous flowers, on erect peduncles, their capsules always green; the leaves markedly cordate only in *V. cucullata*, usually sharply dentate toward the base or lobed. Two of these species differ from the rest in having the spurred petal glabrous and the lateral petal furnished with a strongly clavate beard. Neither of them is given in the manual of Dr. Small, though VIOLA CUCULLATA is not rare in the southern Alleghanies, and V. VIARUM Pollard is reported for Oklahoma. Mr. B. F. Bush, who sent me specimens from Eagle Rock, southern Missouri, reports that the species is very common along the rocky banks of the White River, which flows southeastwardly for over a hundred miles through the Ozark Hills of northern Arkansas.

Another pair of species—V. FIMBRIATULA and V. VILLOSA—differ from the other six in having a finely pubescent foliage. Both are plants of dry sandy soil. *V. fimbriatula* is rather a northern species, reaching southward along the Appalachian Mountains; while *V. villosa* is strictly southern, and affects the lower levels

of the coastal plains. However, to my great surprise, I found it at three stations, 50 or 100 miles apart, in Oklahoma and Arkansas; and in the Biltmore herbarium I noted a specimen that came from Lufkin, Texas, in 1903.

At Biltmore are also to be seen the aberrant forms of *V. fimbriatula*, on which Mr. Pollard based his *V. amorphophylla*.* The specimens were originally collected by members of the Biltmore staff, and came from Oak Mt., Tryon, N. C., near the Skyuka Hotel (alt. 760 m.)—the only known station. Through the kindness of Mr. C. D. Beadle, one of his assistants was allowed to guide me to the station—a trip of two hours by rail to Tryon, and a three hours drive up the mountain. With *V. amorphophylla* were found several familiar species: *V. cucullata*, *V. palmata*, and *V. fimbriatula*; also the two hybrids, *V. cucullata* × *fimbriatula* and *V. fimbriatula* × *palmata*. The *V. fimbriatula* was the somewhat peculiar form of the southern Alleghanies, having at the base of the leaf on either side one or two long slender teeth or auricles. Intermingled with these, and differing from them only in lack of pubescence, were many young plants of *V. amorphophylla*. The query at once arises, how did this anomalous form originate. Many analogous cases lead me to believe that it is a Mendelian derivative from *V. cucullata* × *fimbriatula*, with which it is still growing—inheriting the leaf form of the one parent species and the glabrous character of the other. In confirmation of this view I would state that at this station were found several plants that had the leaf form of *V. cucullata* × *fimbriatula*, but were unlike it in being perfectly glabrous—another derivative, still hybrid in part. Such a plant may be conveniently called a subhybrid; while a plant like *V. amorphophylla*, wholly rid of the hybridity in its parentage, may be called an ex-hybrid. *V. cucullata* × *fimbriatula* is frequently found in the North, appearing in two forms, according as the parent *V. fimbriatula* has the leaves at the base coarsely toothed or merely crenate-serrate. From a hybrid of the latter form I raised in 1908, and have still in the garden, nine offspring reverting variously, as respects the several pairs of opposed characters found in the grandparents, sometimes to one of them and sometimes to the other, and sometimes to the

*Proc. Biol. Soc. Wash. **13**: 129. 1900; Small, Flora of Southeastern U. S. 802.

mother hybrid. Among these nine offspring are two as glabrous as the plant of Mr. Pollard. It is hoped that seeds of the Oak Mt. plants recently sown will another season throw still further light on the status of *V. amorphophylla*.

Viola sagittata and *V. emarginata* constitute another pair of closely allied species; indeed, the latter was originally proposed by Nuttall as a variety of the former. *V. emarginata* grows in much drier soil, and matures wider leaves. It occurs frequently in open woods near Eutaw Springs and Columbia, S. C., and in groves of oak on hillsides at Tryon, N. C.; also abundantly on low hills in the vicinity of Muskogee, Okla. The notched petals that Nuttall observed in the type, and that suggested the name, are rarely found in the plants of the South and West.

Viola sagittata is found through a remarkably wide range—from eastern Massachusetts to southern Louisiana. It is also noteworthy for its inconstancy as respects pubescence. It seems to be normally glabrous; but forms with slight or marked pubescence, like that of *V. fimbriatula*, occur in certain districts of the East, and prevail in the region of the Great Lakes. When these two species grow together, they are generally confluent, not only as regards pubescence, but in length of petiole, in width of leaf, and in sagittate incision at base.* The general situation seems to present a marked instance of an interchange of characters in two allied species through hybridism, continued perhaps from a remote past.†

Viola dentata Pursh has found a place in the Britton Manual as the older name of *V. Porteriana* Pollard,‡ an anomalous plant of not infrequent occurrence in the northern and middle Atlantic States. This in 1904 I interpreted as *V. cucullata* × *fimbriatula*,§ the plant discussed above in connection with *V. amorphophylla*. The identification by Professor Greene of this plant with *Viola dentata* Pursh is based mainly upon its being "quite the same" as an unpublished colored drawing of LeConte's, labeled *V.*

*"Where the two species [*V. fimbriatula* and *V. sagittata*] grow together it is difficult to find the pure species unmixed." Philip Dowell, Bull. Torrey Club **37**: 175. 29 Ap 1910.

†See Rhodora **8**: 57. *pl. 68*. 27 Mr 1906; and Am. Nat. **44**: 233. Ap 1910.

‡Bull. Torrey Club **24**: 404. *pl. 314*. 1897.

§Rhodora **6**: 217. 30 N 1904.

emarginata—a plant that LeConte in his paper on *Viola* considers equivalent to *V. dentata* Pursh.* Having seen this beautiful drawing, through the kindness of Professor Greene, I am convinced that it does represent the *V. Porteriana* of Pollard; but equally confident that it is not the *V. dentata* of Pursh. In other words, LeConte confused three distinct things: *V. sagittata*, var. *emarginata* Nuttall, *V. dentata* Pursh, and a hybrid of *V. cucullata* with *V. fimbriatula*. But the error of LeConte was due in part to the earlier errors of Pursh. This pioneer of North American botany knew plants in the field better than in the printed pages of European authors. It is generally acknowledged that his *Viola primulifolia*—"pubescent, flowers blue, sepals ciliate, on dry hills; Canada to Virginia"—is *V. fimbriatula*, the form with uncut basal lobes; and one who reads carefully his descriptions will, I think, be further convinced that his *Viola sagittata*—"*pubescent*, leaves incised at the base, peduncles *longer* than the leaves: on *dry* hills; New England to Virginia"—is also *V. fimbriatula*, the form with coarsely toothed basal lobes; and that his *Viola dentata*—"*glabrous*, leaves subhastately large-toothed below, peduncles *shorter* than the leaves; in *wet* meadows and woods; Pennsylvania"—is simply *V. sagittata* Aiton. Having misapplied the name *V. sagittata*, Pursh had to coin a new name for the plant of Aiton.†

VIOLA SEPTEMLOBA LeConte is very abundant in the pine barrens of the coastal plains from South Carolina to Mississippi; it was well described by its author 85 years ago, and for 25 years found a place in Eaton's Botany, the most widely used manual of that period. Yet subsequently for half a century it suffered a well-nigh total eclipse; until in 1903 it reappeared to the scientific world in Mr. Pollard's account of the southern violets in Dr. Small's manual. It has been often confused with *V. Brittoniana*, a cut-leaved species of the same group and of similar habitat. But they differ strikingly in at least two respects: (1) The seeds of *V. Brittoniana* are buff and 1.6 mm. long; those of *V. septemloba* are dark brown and 2 mm. long. On weighing 200 seeds of

*Pittonia 3: 256; Bot. Gaz. 26: 340. 1898.

†The full diagnosis of *Viola dentata* Pursh is: "V. glabra; foliis oblongis acutis basi truncatis serratis inferne subhastato grandi-dentatis, pedunculis foliis brevioribus, calycis laciniis linearibus, petalis 3. inferioribus basi barbatis." Fl. Am. Sept. 1: 172. 1814.

each, those of *V. septemloba* were found to be 93 per cent. the heavier, or nearly twice as large.* (2) The leaves of *V. Brittoniana* are palmately parted, *all* of the three primary segments being again twice or thrice split; those of *V. septemloba* are pedately parted, the ultimate lobe at the base often runcinately pointed downward. See PLATE I, FIGURES 3 and 8.†

In accordance with a general rule discussed in the preceding paper, the leaves of *V. septemloba* are also heterophyllous. The older leaves on most plants when in flower are uncut, some of them plainly survivors of an autumn growth. Not infrequently vigorous plants with *all* the leaves uncut are found growing intermingled with normal plants. Specimens of these separated out might easily pass for a different species. Indeed, an intermediate form of *V. septemloba*, with leaves irregularly 3–5-lobed, was published as *V. insignis* by Mr. Pollard in 1898.‡ Because of an earlier use of this name, Professor Greene renamed the plant *V. vicinalis*, recognizing that it was "manifestly related to *V. septemloba*."§

But I find this 3-lobed form constantly associated with the typical form. In scores of large colonies along the Atlantic and Gulf coasts I have found some plants with all the leaves uncut, and some with all the leaves 3-lobed; and sometimes these two leaf forms and the usual 7-lobed leaf occur on the same plant. It seems to me, therefore, that *V. insignis* hardly merits even varietal rank.

VIOLA PEDATIFIDA G. Don is entitled to a place in Dr. Small's Flora, as it occurs not infrequently on the prairies of western Oklahoma. Of all our cut-leaved violets this has a leaf the most pronouncedly multifid; and the cutting is rather on the palmate than on the pedate order, though the name implies the contrary.

* These two measurements are in close agreement. If we assume that both kinds of seeds have the same form and density, their length having the ratio 2/1.6, their volumes will have the ratio $(2/1.6)^3 = 1.95 +$, making the seeds of *V. septemloba* 95 per cent. the larger.

† Le Conte says of his *V. septemloba*: "It is far more worthy of the name *pedata* than the species to which that name has been applied by general consent." Annals N. Y. Lyceum **2**: 141. 1826.—The primary segments of *V. pedata* are further cleft or incised in a *palmate* fashion. See PLATE I, FIGURE 6.

‡ Bot. Gaz. **26**: 334, with a good figure.

§ Pittonia **4**: 9. Ja 1899.

The leaf is primarily three-parted, and when well developed each of the three segments is further trisected, and then each of these subdivisions once more cut into 2–4 lobes. (See PLATE I, FIGURE 2.) In the smaller leaves and in those that appear in summer the lateral primary segments are often imperfectly or obscurely trisected and seem to be somewhat irregularly pedate; and this fact doubtless suggested the inappropriate name of the species. In *V. pedatifida* the middle segment is never uncut, as in leaves strictly pedate, but is even more dissected than the lateral segments.

Synopsis of cucullata-sagittata group of blue stemless violets

Spurred petal glabrous, lateral with clavate beard.	
Leaves uncut, broadly cordate-ovate.	*V. cucullata.*
Leaves pedately lobed or parted.	*V. viarum.*
Spurred petal villous at base, lateral with capillary beard.	
Foliage finely pubescent.	
Leaves ovate-oblong, acute.	*V. fimbriatula.*
Leaves ovate to orbicular, obtuse.	*V. villosa.*
Leaves oblong-lanceolate, incised at base.	*V. sagittata.*
Foliage nearly or quite glabrous.	
Leaves oblong-lanceolate, incised at base.	*V. sagittata.*
Leaves deltoid to broadly ovate, coarsely toothed at base.	*V. emarginata.*
Leaves uncut or pedately 3–9-lobed.	*V. septemloba.*
Leaves palmately cut into 9–30 lobes.	*V. pedatifida.*

All the species of white stemless violets found in the North, except *Viola renifolia*, are found also in the territory embraced in Dr. Small's Flora; and in addition one not found in the North, *V. vittata* Greene. But only two of the northern species, *V. lanceolata* and *V. primulifolia*, are widely distributed in the South —*V. pallens*, *V. blanda*, and *V. incognita* being restricted there to the upland region of the southern Alleghanies.

In this group pubescence proves to be an inconstant character. VIOLA PRIMULIFOLIA, which in the extreme North is quite glabrous, becomes more and more pubescent as we go southward, untili n the Gulf States it is often densely villous on the petiole and lower leaf surface. This variety was first noted by LeConte, and named var. *villosa* by Amos Eaton, when he adopted in his Manual LeConte's treatment of the genus. Mr. Pollard's var. *australis* seems to cover the same ground.

VIOLA VITTATA Greene (*V. denticulosa* Pollard), an odd species with long linear leaves, is at times almost glabrous, and seems

to have been so in the type specimens, as the author makes no mention of any pubescence. But usually more or less hairiness appears on the petioles and lower leaf surfaces, and they are sometimes densely villous.

VIOLA BLANDA Willd. is glabrous except for scattered white hairs on the upper surface of leaves that unfold at flowering. But in Tryon, N. C., I found a colony without a trace of white hairs; and plants transferred to the garden, and their offspring, have continued perfectly glabrous.

The type of VIOLA RENIFOLIA Gray is markedly pubescent throughout; but the more common form has at least the upper leaf surface glabrous, and has been published as a species, *V. Brainerdii*, by Professor Greene.* But the difference between the two plants, though perhaps worth naming, is not specific, according to my conception of species.

VIOLA INCOGNITA Brainerd is also inconstant as respects pubescence. The type has "peduncles, petioles and lower surface of leaves pubescent with soft white hairs especially when young, the upper leaf surface glabrous or nearly so."† But in low moist woods nearly glabrous forms are frequent, usually with minute white hairs on the upper surface of the later leaves, as in *V. blanda*. Though in all other characters these two forms are identical, yet I find their marked difference in pubescence has been a source of confusion to students of *Viola*: and I would therefore distinctly mark off this form, as

Viola incognita, var. **Forbesii**, var. nov. Nearly or quite glabrous, except often for scattered white hairs on the upper leaf surface; otherwise like the type. A common form in moist woodlands, from eastern Quebec westward to Wisconsin, and southward to the mountains of eastern Tennessee.

All forms of *V. incognita*, except certain hybrids, differ from *V. blanda* Willd. in having at maturity broader leaves with deeper and wider sinus at the base, in having the lateral petals bearded, the upper petals obovate and not porrect, and in flowering a week or two earlier. But the most marked difference appears in the seeds, which in *V. incognita* are obtuse at base, brown, smooth,

* Pittonia 5: 89. 1902.

† Rhodora 7: 248. 31 D 1905.

2 mm. long; and in *V. blanda* acute at base, dark brown, minutely rugose, 1.5 mm. long. The accompanying figure is given to bring out these differences, and incidentally to illustrate the diagnostic value of seed characters in *Viola*.

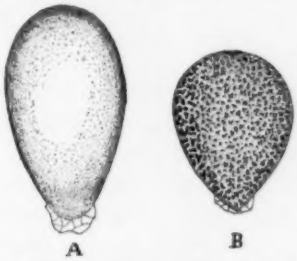

FIGURE 1. *A*, a seed of Viola incognita; *B*, a seed of Viola blanda; × 15.

MIDDLEBURY, VERMONT

Explanation of plate 1

All the figures × ⅔

1. *Viola palmata* L. Lake Co., Fla.	Palmately cut.
2. *V. pedatifida* G. Don. Muskogee, Okla.	
3. *V. Brittoniana* Pollard. Dedham, Mass.	
4. *V. Egglestonii* Brainerd. West Nashville, Tenn.	
5. *V. triloba* var. *dilatata* (Ell.) Brainerd. Mansfield, La.	Pedately cut.
6. *V. pedata* L. Terra Cotta, D. C.	
7. *V. esculenta* Ell. Jacksonville, Fla.	
8. *V. septemloba* LeConte. DeLand, Fla.	

Studies on the Rocky Mountain flora — XXV

PER AXEL RYDBERG

Ptilocalais macrolepis Rydb. sp. nov.

Perennial with fusiform roots; stem glabrous, 2–5 dm. high, somewhat branched, glabrous or minutely puberulent; lower leaves somewhat petioled, the upper sessile; blades linear-lanceolate, entire or rarely pinnatifid with linear-lanceolate, divergent divisions; heads solitary at the ends of the slender naked branches; involucres turbinate, about 2 cm. high. Calyculate bracts 8–10, lanceolate or linear-lanceolate, 3–6 mm. long; bracts proper 12–15, linear-lanceolate, attenuate; achenes about 7 mm. long, puberulent on the rounded angles or glabrate; pappus-scales lanceolate, 4–5 mm. long, gradually tapering upwards; bristles 6–7 mm. long.

In habit this species is intermediate between *Ptilocalais nutans* and *P. major*, with the head of the latter, but it differs from both in the pappus-scales. In the original description of *Ptilophora major*, Gray gives no description of the pappus, stating that his specimens were too young. In the Columbia University herbarium there is a duplicate of the type, collected by Spalding. This has fairly well developed fruit and shows that *Ptilocalais major* has practically the same pappus as *P. nutans*, i. e., the paleaceous portion is only 2 mm. long, oblong in outline, truncate and somewhat 3-toothed at apex. *P. macrolepis* grows in sandy soil at an altitude of 1200–1500 m.

UTAH: Benches near Salt Lake City, Apr. 30, 1904, *A. O. Garrett 182* (type, in herb. N. Y. Bot. Gard.); Red Rock Cañon, June 11, 1905, *Rydberg 6105*; Salt Lake City, May 12, 1880, *M. E. Jones 1707* (at least in part); benches near Salt Lake, June 1, 1900, *Stokes*.

PTILORIA

Professor Nelson, in the New Manual of Botany of the Central Rocky Mountains, restores the name *Stephanomeria*, following the Vienna Rules. The only criticism I have to make of the treatment of the genus is that he has reduced *Ptiloria ramosa*

Rydb. to a synonym of *S. tenuifolia* (Torr.) Hall. In the herbarium of the New York Botanical Garden there is a good specimen of *P. ramosa* collected by Aven Nelson and Elias Nelson, viz., *no. 5985*. This is labeled *Ptiloria pauciflora* (Torr.) Raf. It agrees well with Nelson's description of *S. pauciflora*, except as to the pappus, but it is very unlike the type of *Prenanthes pauciflora* Torrey, collected by James and preserved in the herbarium of Columbia University. *Ptiloria pauciflora*, so far as I know is not found so far north as Wyoming.

ADOPOGON

Professor Nelson has readopted *Krigia* for this genus and perhaps rightly so, as most of Necker's genera can scarcely be called published. However, he wrongly adopts the name *Krigia virginica* (L.) Nels. for the only species found in the region, notwithstanding the fact that there is an older *Krigia virginica* (L.) Willd.

CREPIS

Under *Crepis runcinata* we find in the New Manual the following synonyms and remarks. "(*C. platyphylla* Greene . . . ; *C. glaucella* Rydb. . . . , *C. tomentulosa*, *C. perplexans*, and *C. petiolata* Rydb. . . . To recognize the foregoing one would first have to assume a hypothetical *C. runcinata*.)" There is hardly need of assuming a hypothetical *C. runcinata*, for there are found in the region where the type of *Hieracium runcinatum* Torr.* was collected at least two plants which agree very well with the original description. One is the plant for which I have adopted the name *Crepis runcinata*, the other is *C. riparia* A. Nels. Most of James' plants are in the old Torrey herbarium, but the type of *Hieracium runcinatum* is not there. Torrey's description is very clear, however, and calls for a strongly hairy plant. All the synonyms cited above, except *C. platyphylla*, represent glabrous plants (except as to the involucres), and more closely related to *C. glauca* than to *C. runcinata*. *Crepis platyphylla* Greene is closely related to *C. riparia* and perhaps not distinc ,

*Ann. Lyc. N. Y. 2: 209. 1826.

at least it is more closely related to it than is *C. denticulata* Rydb., which Professor Nelson reduces to a variety. A "conservative" botanist would unite *C. platyphylla* Greene (*C. runcinata hispidulosa* Howell) and *C. riparia*. The latter would then be reduced to synonymy, as the form r name is three years older In Torrey and Gray's Flora, *Hieracium runcinatum* was transferred to *Crepis* and the authors cite four specimens, of which two, viz., those collected by Drummond (*Crepis biennis* β Hook.*) and by Nicollet are preserved in the Torrey herbarium. These agree with the description of Torrey's *Hieracium runcinatum*. I have adopted the name *Crepis runcinata* for these specimens rather than to transfer the name to *C. riparia*. If Professor Nelson had reduced *C. tomentulosa* to a synonym of *C. glauca*, I would have made no objection, for I myself am somewhat suspicious that it may be only a state or condition of that species. *Crepis petiolata* and *C. glauc lla* are closely related to it, and the glandular involucre is the only character which would associate it with *C. runcinata*. *C. perplexans* is closer to *C. runcinata*, but it also is a glabrous plant.

Both *Crepis denticulata* Rydb. and *C. alpicola* A. Nels. are included in *C. riparia parva* A. Nels. *Crepis alpicola* was technically based on *C. runcinata alpicola* Rydb. The type of both the latter and *C. denticulata* are in the herbarium of the New York Botanical Garden and they are not at all alike. Nelson's description of *C. riparia parva* agrees with *C. alpicola* but not with *C. denticulata*. Compare the original descriptions.

Crepis angustata Rydb. is made a synonym of *C. gracilis* (D. C. Eaton) Rydb. The plant described by Professor Nelson is, however, not *C. gracilis* but *C. angustata*. *Crepis gracilis* was established on *C. occidentalis gracilis* D. C. Eaton.† The type of this is *Watson 716*, a duplicate of which is in the Columbia University herbarium. It is a plant exceedingly like *C. scopulorum* in habit, but the involucre is narrower, the bracts fewer, and the achenes distinctly ribbed. Some of the involucral bracts have a few black hairs as they have in *C. scopulorum*. *Crepis angustata*, like *C. intermedia*, never has black hairs. *C. gracilis*

*Fl. Bor.-Am. 1: 297.

†Bot. King. Exp. 203. 1871.

I think has been redescribed under the name *C. exilis* Osterhout,* omitted by Nelson.

Crepis pumila Rydb. is made a synonym of *C. occidentalis*. *C. pumila* is not only a lower plant, without any trace of black glandular hairs, but it has different, perfectly columnar achenes. Apparently it was included by Dr. Gray in his *C. occidentalis costata*.

Crepis atribarba Heller is made a synonym of *C. barbigera* Leiberg. The two are not even closely related. The latter is not found within the region, and there was no need of even considering it.

Crepis seselifolia sp. nov.

Perennial with an ascending rootstock and short base covered by remains of old leaves; stem 4–6 dm. high, slender, canescent-tomentulose or the upper part glabrous; basal leaves long-petioled; blades 1–2 cm. long, deeply twice pinnatifid, with linear filiform divisions, canescent-tomentulose, caudate-acuminate, with an elongated linear entire end 5–8 cm. long; stem-leaves subsessile, less divided or the uppermost entire and linear-filiform; heads corymbose-paniculate; involucre glabrous, cylindric, about 1 cm. long; calyculate bracts ovate or ovate-lanceolate, only 1–1.5 mm. long; bracts proper 5–7, linear, yellowish green; flowers 5–7; ligules nearly 1 cm. long; achenes somewhat fusiform, striate.

In habit this species resembles most *Crepis gracilis* (D. C. Eaton) Rydb., but the divisions of the leaves are much narrower and often again divided into very narrow divisions, and the involucre is glabrous as in *C. acuminata*. The leaves resemble those of certain species of the genus *Seseli*.

IDAHO: Rocky hillsides, scarce, valley of Big Potlatch River, Nez Perces County, Idaho, June 6, 1892, *Sandberg, MacDougal & Heller 326* (type, in herb. N. Y. Bot. Gard.).

HIERACIUM

Professor Nelson includes both *Hieracium umbellatum* L. and *H. canadense* Michx. in the flora of the Rocky Mountains. Neither is found in the region. *H. umbellatum* is exceedingly rare in America and confined to the extreme northeastern part, evidently an introduced plant. *H. columbianum* on account of its

*Muhlenbergia 1: 142. 1906.

narrow leaves (narrower than in *H. canadense*) has sometimes been confounded with *H. umbellatum*, sometimes with *H. canadense* on account of its hairy stem. The common plant of the West, which has been confounded with both, is *H. scabriusculum* Schwein.* (*H. macranthum* Nutt.†). Narrower-leaved specimens have been named *H. umbellatum* and broader-leaved ones, *H. canadense*. It differs from *H. canadense* in the glabrous stem and finely scabrous-puberulent leaves. *H. columbianum* has long white or yellow hairs on the lower part of the stem.

The true *Hieracium Scouleri* Hook. is not found in the region. A duplicate of the type is in the old Torrey herbarium. It is an almost scapose plant with the broad leaves obtuse at the apex and gathered near the base of the stem. The stem-leaves are few and small and the involucral bracts hirsute with short dark hairs. The plant resembles more *Hieracium albiflorum* in habit than it does *H. griseum* and *H. cynoglossoides*. The plant with long-hairy involucre which, mainly, Dr. Gray described in his Synoptical Flora and Professor Nelson described in the New Manual is not *H. Scouleri*. It should be known as *H. albertianum* Farr.‡

Heteropleura Fendleri (Schultz Bip.) Rydb. comb. nov.

Crepis ambigua A. Gray, Mem. Am. Acad. **4**: 114. 1849. Not *C. ambigua* Balb. 1805.

Hieracium Fendleri Schultz Bip. Bonplandia **9**: 173. 1861.

Heteropleura ambigua Schultz Bip. Flora **45**: 435. 1862.

Hieracium nigrocollinum S. Wats. Proc. Am. Acad. **25**: 133. 1890.

This species has been included in *Hieracium* by Dr. Gray and others. It would be better to include it in *Crepis* than in *Hieracium*, for the achenes are tapering upwards and the pappus is tawny, not white. The involucral bracts are not thickened on the back, however, as they are in most species of *Crepis*, and the general habit resembles perhaps more that of *Hieracium* than of *Crepis*. It does not fit well in either genus, at the same time

* Long's Second Exp. **2**: 394. 1824.

† Trans. Am. Phil. Soc. II. **7**: 446. 1841.

‡ Ottawa Nat. **20**: 109. 1906.

combining characters of both. Either the two genera should be united or else this species and several others of the southwestern United States and Mexico should be separated as a distinct genus. Even Fries in his Symbolae Hieraciorum recognized this fact and suggested the name *Crepidispermum*. He did not exactly publish the genus and no binomial names were given under the genus. Besides, in the same year a genus *Crepidospermum* B. & H. was published. The two names differ only in one letter, the connecting vowel *i* in one case and *o* in the other. The former is the Latin connecting vowel, the latter the Greek, which is sometimes used in Latin for euphony's sake. The two names may therefore be regarded as identical. The two brothers Schultz of Zweibruecken adopted Fries' suggestion and established the genus under the name *Heteropleura*, as alternate ribs of the achenes are stronger. The present species was given the name *Heteropleura ambigua*, based on *Crepis ambigua* A. Gray. As there is an older *C. ambigua* Balb., that specific name is not available, and hence I have adopted *Heteropleura Fendleri*.

AGOSERIS

Professor Nelson reëstablishes the name *Troximon* for this genus, evidently following as he thought the Vienna Rules and cites Nuttall as authority for the genus. This is a similar case to that of *Actinella* and *Tetraneuris*. In fact Nuttall never established a genus *Troximon*. He thought that his two species belonged to the genus *Troximon* Gaert. *Troximon* of Gaertner was established in 1791 on *Tragopogon Dandelion*, *T. virginicum*, and *T. lanatum*, of which the first two belong to one genus, *Krigia* or *Adopogon*, and the last is a *Scorzonera*. Even if Nuttall had established a genus *Troximon*, this would not hold, for then it was not published before 1818 in his Genera, while Rafinesque's name dates from 1817. It is true that *Troximon* appeared in Fraser's Catalogue of 1813, but there it is without description. In his Genera, Nuttall credits Gaertner with the name. So does also Pursh in his Flora, 1814. There is therefore no warrant for reviving *Troximon* for the genus known in later years as *Agoseris*.

A good deal may be said regarding Professor Nelson's treatment of this genus, especially in the way synonyms have been

cited. *Agoseris attenuata* Rydb. is given as a synonym of *T. pubescens* (Rydb.) A. Nels. *A. attenuata* has perfectly glabrous leaves, only the involucre and the upper part of the scape being villous. It would be included in *Agoseris pumila* (Nutt.) Rydb., were it not for the decidedly acuminate inner bracts. It has very little indeed to do with the decidedly pubescent *A. pubescens.*

Agoseris maculata Rydb. is made a synonym of *Troximon villosum* (Rydb.) A. Nels. It is true that they much resemble each other in general habit and pubescence, but the outer bracts in *A. villosa* are obtuse or even rounded at the apex, while those of *A. maculata* are abruptly and distinctly acuminate. *A. villosa* is a plant of the lowlands of Montana, westward and northward, while *A. acuminata* is an alpine or subalpine plant of the mountains of Colorado.

Troximon roseum Nutt., *Agoseris agrestis* Osterhout, and *A. roseata* Rydberg are made synonyms of *Troximon glaucum.* I have not seen the type of *T. roseum* Nutt., but, as I interpret it, it is a plant closely related to *T. laciniatum* Nutt., not to *T. glaucum. Agoseris agrestis* Osterhout is related to *A. glauca,* but if made a synonym of anything it should be of *Troximon pumilum* Nuttall, having the same pubescent involucral bracts, but the leaves are pinnatifid and caudate-acuminate instead of entire and obtuse or rounded at the apex.

Under *Troximon glaucum dasycephalum* Professor Nelson gives a citation from Piper's Flora of Washington: "This plant differs from *T. glaucum* only in having a pubescent involucre. It is scarcely worth nomenclatural recognition." I think that both Piper and Nelson are incorrect in this statement. In *Agoseris glauca* (Nutt.) Greene the involucre is decidedly obconic, and the leaves narrowly oblanceolate or linear and glaucous; in *Agoseris scorzoneraefolia* (Schrad.) Greene (*Troximon glaucum dasycephalum* T. & G.) the involucre is decidedly campanulate, sometimes in age almost hemispheric, the outer bracts and the leaves broader, and the latter scarcely glabrous. Those who have access to the Botanical Magazine may compare *plate 1667* and *plate 3462,* which give good illustrations of *Agoseris glauca* and *A. scorzoneraefolia* respectively.

Under *Troximon glaucum dasycephalum, Agoseris altissima* is

given as a synonym. The latter plant is a decidedly pubescent plant and should be associated rather with *A. villosa*, but is taller and its flowers turn deep purple in age.

Under the variety *pumilum* we find *Agoseris Leontodon* Rydb. as a synonym. The latter was based on *Macrorhynchus glaucus laciniatus* D. C. Eaton. Dr. Gray included in his *Troximon glaucum laciniatum* a multitude of forms, in fact everything of the *A. glauca* group with laciniate leaves. *Macrorhynchus glaucus laciniatus* D. C. Eaton is not found east of Nevada. It is related to *Stylopappus laciniatus* Nutt.

Under *Troximon arachnoideum* (Rydb.) A. Nels. are found the following: "*T. glaucum laciniatum* in part (not *T. laciniatum* Gray . . . ; *Agoseris laciniata* Greene; *A. arachnoidea* Rydb. . . .)." The plant described by Professor Nelson is the same as *Stylopappus laciniatus* Nutt. A duplicate of Nuttall's type is in the old Torrey herbarium, and it is to be known as *Agoseris laciniata* (Nutt.) Greene. If *Troximon* is used the name should be *T. laciniatum* (Nutt.) A. Gray, although Dr. Gray described under that name an entirely different plant from Nuttall's *Stylopappus laciniatus*. The type of the latter did not have developed fruit and both Nuttall and Gray thought that it was related to *Stylopappus grandiflorus* Nuttall, or *Troximon grandiflorum* A. Gray. Its achenes are of the *A. glauca* type with short striate beak. (See further below.) To use the name *Troximon arachnoideum* for this plant was entirely out of place, for *Agoseris arachnoidea* Rydberg is an entirely different plant of the *A. aurantiaca* group, with long filiform, non-striate achene-beak, in age purple flowers, and with densely pubescent leaves. Evidently Professor Nelson did not know the plant.

Under *Troximon purpureum* we find the following synonyms: "*Macrorhynchus purpureus* A. Gray . . . ; *T. gracilens* A. Gray . . . ; *A. Greenei* Rydb. as to our range." In the herbarium of Columbia University there is a duplicate of the type of *Macrorhynchus purpureus* A. Gray. It is a low plant scarcely more than 1 dm. high, with narrow, pinnatifid, glaucous and glabrous leaves and brightly spotted involucral bracts. Professor Nelson characterizes his *Troximon purpureum* as being tall, 2–5 dm. high, with leaves tapering into long, slender, winged petioles. Evi-

dently Professor Nelson did not have in mind the true *Macrorhynchus purpureus*, on which *Troximon purpureum* (A. Gray) A. Nels. should have been based, but a mixture of *A. gracilens* and *A. Greenei* Rydb. If any reduction should have been made, *T. gracilens* should have been made a synonym of *Troximon aurantiacum* Hook. In the herbarium of Columbia University there is a duplicate of the type of the latter and one specimen cited in the original description of the former. The only difference I can see is that the outer bracts in *T. aurantiacum* are broader and inclined to be obtuse. As to *Agoseris Greenei* Rydb. the name has to be changed. The plant should be known as

AGOSERIS GRAMINIFOLIA Greene, Bull. Torrey Club **25**: 124. 1898.

Troximon gracilens Greenei A. Gray, Proc. Am. Acad. **19**: 71. 1883.

Agoseris gracilenta Greenei Greene, Pittonia **2**: 177. 1891.

Agoseris Greenei Rydb. Mem. N. Y. Bot. Gard. **1**: 459. 1900.

Not *Agoseris Greeneana* O. Kuntze, Rev. Gen. Pl. 304. 1891.

Troximon purpureum A. Nels., Coult. & Nels. New Man. Cent. Rocky Mts. 599, in part. 1909. Not *Macrorhynchus purpureus* A. Gray. 1859.

For this species I had adopted the name *Agoseris Greenei*, basing it upon *Troximon gracilens Greenei* A. Gray, but I had overlooked the fact that there had been published an *Agoseris Greeneana* based on *Troximon elatum* Greene. The latter should be known, however, as *A. major* Jepson, published in September, 1891, while Kuntze's name was published in October, 1891.

A closer investigation of *Agoseris graminifolia* persuaded me that it could not be kept distinct from *A. Greenei* (A. Gray) Rydb. although the leaves of the specimens from type collection are more entire than usual. On the sheet in the collection of the New York Botanical Garden they are wholly entire, but the figure published and drawn from the type specimen shows four leaves with a few short lobes.

Under *Troximon arizonicum* Professor Nelson gives as synonyms *Agoseris elongata* Greene, *A. rostrata* Rydb., and *A. humilis* Rydb. The first is only a manuscript name, but the specimens so named are rightly referred to *T. arizonicum*. *Agoseris humilis*

is related to *A. gracilens* and *A. aurantiaca* and should have been included in the latter as characterized by Professor Nelson. *Agoseris rostrata* is not closely related to either but is the next relative to *A. grandiflora* of the Pacific Slope, having the same short outer bracts and elongated inner ones and the same very long and slender beak of the achenes, nearly three times as long as the body. It is the "*T. grandiflorum* as to our range," an expression which Professor Nelson erroneously uses under *Troximon montanum*.

Agoseris turbinata sp. nov.

Perennial with taproot and short caudex; leaves narrowly linear, 7–15 cm. long, 1–5 mm. broad, glabrous, bluish green, the midvein and base often purplish, entire, attenuate; scape about 3 dm. high, slender, sparingly villous, more densely so under the head; involucres turbinate, 17–20 mm. high; bracts all narrowly lance-linear, villous on the back as well as on the margins, with dark purple middle and yellowish green margins; ligules 15–18 mm. long, yellow with purplish veins, turning pinkish in age; beak of the achenes short and striate.

This resembles in many respects *Agoseris parviflora* in habit, but differs in the villous scape and involucre and in the beautifully variegated bracts.

ALBERTA: Gravel Slope of Tunnel Mountain, *McCalla 2063* (type, in herb. N. Y. Bot. Gard.).

Agoseris obtusifolia (Suksd.) Rydb. nom. nov.

Troximon grandiflorum obtusifolium Suksd. Deuts. Bot. Monats. **18**: 98. 1900.

This is characterized by the broad oblong obtuse lobes and the obtuse or even rounded apex of the leaves. I think that it deserves specific rank. It has been collected in western Idaho.

Agoseris tenuifolia (A. Gray) Rydb. nom. nov.

Troximon grandiflorum tenuifolium A. Gray, Bot. Calif. **1**: 438, in part. 1876.

Troximon laciniatum A. Gray, Proc. Am. Acad. **19**: 72, in part. 1883. Not *Stylopappus laciniatus* Nutt. Trans. Am. Phil. Soc. II. **7**: 432. 1841.

In the Botany of California Gray gives a short description of

Troximon grandiflorum tenuifolium, and points out the characters distinguishing it from *T. grandiflorum*. He gives as a synonym *Stylopappus laciniatus longifolius* Nutt., but a duplicate of the type of the latter collected by Douglas is in the Columbia University herbarium and in this specimen the outer bracts are not dilated as they are in *A. grandiflora* and its relatives.

In the Proceedings of the American Academy, vol. 19, Dr. Gray adopts the name *Troximon laciniatum*, giving as synonyms *Stylopappus laciniatus* Nutt. and its variety *longifolius*; also *Troximon grandiflorum* var. *tenuifolium* and var. *laciniatum* of the Botany of California. A duplicate of Nuttall's type of *Stylopappus laciniatus* is also in the Columbia University herbarium. In later years many specimens matching this specimen have been collected in Wyoming, Colorado, Utah, and Idaho. This is a species with achenes of the type of *Agoseris glauca* and was probably included in Gray's *Troximon glaucum laciniatum*, but it is not *Macrorhynchus glaucus laciniatus* D. C. Eaton. In my Flora of Colorado, I adopted the name *Agoseris laciniata* (Nutt.) Greene for this species. Professor Aven Nelson describes it in the New Manual as *Troximon arachnoideum* (Rydb.) A. Nels. It has nothing to do with *Agoseris arachnoidea* Rydb. See above, p. 18.

TARAXACUM

Professor Nelson's treatment of *Taraxacum* is good. He acknowledges six species, instead of only one as Dr. Gray did. The only criticism I have to offer is that *Taraxacum leiospermum* Rydb. is made a synonym of *T. angustifolium* Greene. It is true that in both the lower part of the achenes is smooth, but otherwise there are several discrepancies between the descriptions of the two. *T. angustifolium* is characterized as having narrow, oblong-linear leaves, and the outer bracts few and small, in a single series, and erect, while in *T. leiospermum* the leaves are broadly oblanceolate and the calyculate bracts are in 2 or 3 series and with spreading tips, as in *T. dumetorum*.

LACTUCA L.

Professor Nelson has given a new specific name to the more common prickly lettuce of the Rocky Mountain region. It has

usually been known as *Lactuca Scariola* L., which name has included all the prickly lettuces found introduced in North America, viz., *L. Scariola* L., *L. virosa* L., *L. saligna* L., etc. The plants with merely toothed leaves were referred to *L. virosa* L. by Dr. N. L. Britton, but Mr. L. F. Dewey of the United States Department of Agriculture contends that it is not *L. virosa* but *L. Scariola integrata* Gren. & Godr. Mr. Dewey is followed by Robinson & Fernald in Gray's New Manual. So also by Professor Nelson, but he regards it as specifically distinct from *L. Scariola* and proposes the name *L. integrata* (Gren. & Godr.) A. Nels. This was altogether unnecessary for *L. Scariola integrata* Gren. & Godr.* was based on *L. augustana* All.† Allion gives a good figure.

Linnaeus in his first edition had only one species, *Lactuca virosa*, with three varieties. In the second edition *L. Scariola* is adopted for *L. virosa* var. δ of the first edition. Both *L. virosa* and *L. Scariola* are based on figures in Morison's Historia, and the figure cited under *L. virosa* resembles indeed very much the more common plant introduced in the Rocky Mountain region, much more so than Allioni's plate of *L. augustana* does. The difference between *L. virosa* and *L. Scariola* given by Linnaeus is that the former has toothed horizontal leaves while in the latter they are pinnatifid and vertical. The plant answering the description of *L. Scariola* has been collected in Utah and Montana but the plant with merely toothed leaves is more common. Mr. Dewey's contention may be correct as far as the plant around Washington and Boston is concerned, but I think the plant of the Rockies and the Pacific Slope is *L. virosa*. So far as I know, the leaves are not turned on edge as they are in *L. Scariola* and Professor Nelson describes the achenes of his *L. integrata* as being dark-colored instead of pale. Dewey described the achenes of *Lactuca virosa* as being darker and broader than in *L. Scariola*, while he could not find any differences between those of the latter and the var. *integrata*. There is another character which helps to distinguish *L. virosa* and *L. Scariola*. In the latter, the branches of the panicle are inclined to be racemiform, while in *L. virosa* they are more branched with more or less diverging branchlets.

*Fl. Tran. 320. 1850.

†Fl. Pedem. 1: 224. 1785.

The Rocky Mountain specimens agree in this respect with *L. virosa*. They have also the obtuse lower leaves of that species as figured by Morison, as illustrated in Sweet's English Botany, in Baxter's British Phaenogamous Botany, and in the Flora von Deutschland. Allioni's illustration of *L. augustana* shows only the upper part of the plant, but all the leaves shown are decidedly acute.

Lactuca polyphylla sp. nov.

Biennial; stem stout, about 1 m. high, glabrous; leaves sessile and slightly auriculate-clasping, very numerous, linear-lanceolate, entire, acuminate, 1–2 dm. long, glabrous, not at all spinulose; panicle conical, much branched, about 3 dm. long, 1.5 dm. broad; involucres about 1 cm. high; outer bracts lanceolate, about half as long as the linear-lanceolate inner ones; achenes nearly black, 3–4 mm. long, oval, indistinctly 3-nerved, transversely rugose; beak about 2 mm. long.

The type was determined as *Lactuca integrifolia* Bigel., but it differs from that purely eastern species in the numerous more willowlike leaves, the stout stem, the numerous heads in a more compact panicle and the short beak of the achenes.

IDAHO: Lake Pend d'Oreille, Aug. 5, 1885, *E. L. Greene* (type in herb. Columbia Univeristy).

NEW YORK BOTANICAL GARDEN,
BRONX PARK, NEW YORK CITY

Some common species of Crataegus at Thompson's Mills, Georgia

H. A. Allard

Within the confines of the little settlement of Thompson's Mills, several handsome species of *Crataegus* are very abundant. Within a stone's throw of the settlement, on a pasture hillside covered mainly with a heavy growth of tall pines, the underbrush consists almost entirely of various species of *Crataegus*, one of which, *Crataegus Beadlei* Ashe, has not before been reported for Georgia. In this particular lot, which has been pastured to hogs and stock for a long time, the profusion and vigor of the various intermingling species seems to depend largely upon the noticeable enrichment of the soil and its thorough cultivation, so to speak, by the great number of hogs that are kept on this enclosure. *Crataegus Crus-galli* L., *C. spathulata* Michx., *C. uniflora* Muench., *C. collina* Chapman, and *C. Beadlei* Ashe were everywhere in evidence.* Concerning the habits of growth and ornamental characteristics of these species the writer has made notes, from time to time, which may be of some interest to those studying the *Crataegus* group in Georgia.

Crataegus Crus-galli L. This is one of the commonest and most ornamental thorns in the Thompson's Mills region. It is found in woods and in open fields. The finest and most symmetrical specimens are found on pasture hillsides, where they become profusely branched trees twenty feet or more in height. About May 1 in this region, this *Crataegus* bursts suddenly into bloom and becomes whitened with numerous clusters of fragrant blossoms about 0.5 inch in diameter. Each corymb contains from 10–25 white blossoms. These corymbs, about 1.5 inches across, are exceedingly abundant on some shrubs and are subtended by rosettes of rich, dark green shining leaves which seem to heighten both colors by their striking contrast. The pink or rose-colored

* The species of *Crataegus* mentioned in this paper were identified through the kindness of W. W. Eggleston, of the U. S. Dept. of Agriculture, Washington, D. C.

anthers likewise add to the attractiveness of the flowers. The odor of the blossoms is pearlike, permeating the woods around, and attracting swarms of bees and wasps.

The leaves are usually obovate or oblanceolate and finely serrate from the middle to the obtuse or almost truncate apex. On the upper surface they are very dark shining green as if varnished; beneath paler and smooth throughout. Formidable thorns are developed in great abundance; they are strong, sharp and slender, and range from 1.5 to 2 inches in length.

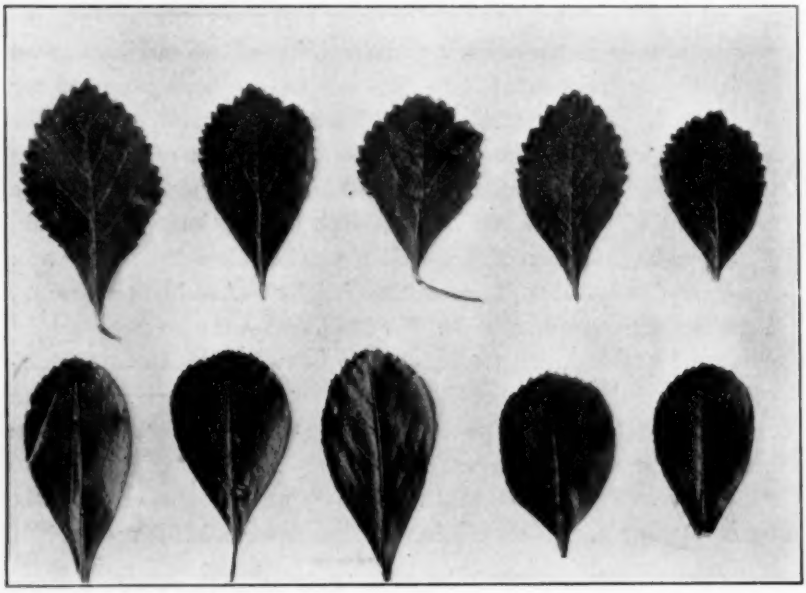

FIGURE 1. Upper row, leaves of *Crataegus uniflora*; lower row, leaves of *C. Crus-galli;* about four fifths natural size.

The corymbs of this *Crataegus* usually burst into bloom almost simultaneously, and a day or two later the white petals are falling in showers like snowflakes.

The fruit of *C. Crus-galli*, which is more or less oval in shape, ripens late in October. During the season of 1910, the fruit of this thorn was still green or only slightly reddened on one side on October 18. When ripe the color is a pale red. The abundant foliage is shed early. During the season of 1910 defoliation was complete before the middle of October, although the green fruit

was still retained. This *Crataegus* fruits abundantly in enriched soils, but is oftentimes quite barren on sterile, rocky hillsides. It is a common pasture species on the plantation of the J. N. Thompson Co., and is the favorite nesting site of the mocking bird in this region.

CRATAEGUS SPATHULATA Michx. This is a very common species in various situations at Thompson's Mills. It occurs in

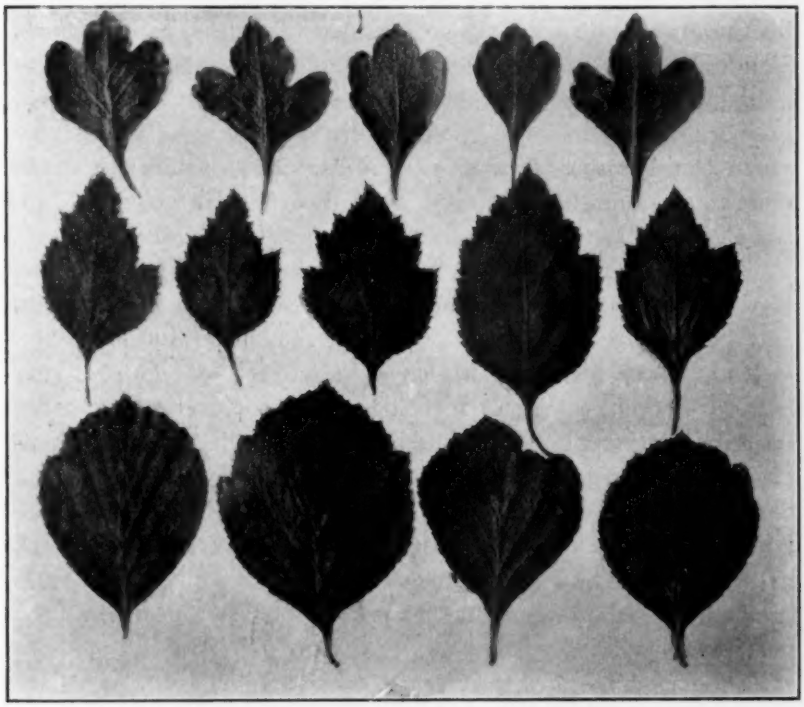

FIGURE 2. Uppermost row, leaves of *Crataegus spathulata;* middle row, *C. Beadlei;* lowest row, *C. collina;* about two thirds natural size.

deep, rich clay soils abundantly supplied with moisture and also in thin dry soils barely covering ledges of rocks. In the former situation it may become a much branched, graceful, showy tree 20 to 25 feet in height. In the latter, it assumes a low, fantastic, broad-headed, gnarled, and irregular habit of growth. In some situations this thorn forms almost impenetrable thickets. In the open, the stiff, tortuous branches sometimes grow in well defined,

horizontal or downward sloping planes. The almost vertically growing leaves are very abundant, smooth above, and rather a dull shade of dark green. These are arranged almost invariably along the upper side of the branches in numerous close clusters which closely invest the compound corymbs of small, white, numerous bossoms. Each flower cluster is made up of from 12 to 25 blossoms. The buds are sometimes rose-tinged. About May 1, the slender branches become graceful, white flower plumes, which fill the air around with a pleasing, penetrating, spicy fragrance. Slender, tapering thorns from 1 to 1.25 inches long are usually abundant. The bark of this *Crataegus* is usually smooth and gray or brownish in color. The tiny fruits are ripened abundantly about October 15 at Thompson's Mills. These fruits are small, globose or somewhat flattened, reddish orange in color, and do not shed readily when mature as with *C. uniflora* and others.

The fruits are dry and possess little taste. This thorn is one of the most ornamental shrubs in the Thompson's Mills region, and deserves far more attention than it usually receives.

CRATAEGUS UNIFLORA Muench. This pretty little *Crataegus* is a very common species in fields and rocky pastures. In the stock pasture mentioned at the beginning of this paper, particularly fine round-headed specimens of this thorn are everywhere common. Here it is a small, much branched shrub usually from two to about four feet in height. Under favorable conditions its short, numerous, stiff branches grow out equally on all sides producing a compact, rounded and symmetrical shrub of very pretty appearance.

The pale green mostly obovate or oblong cuneiform leaves are crenate-toothed and finely pubescent, so that it appears as if the upper surface were covered with the thinnest gossamer.

The almost sessile blossoms, which are about 0.5 inch in diameter, appear about the first week of May and are mostly solitary or in corymbs of two or three. The small size of these blossoms makes them rather inconspicuous among their leaf rosettes, so that they do not greatly add to the ornamental qualities of the shrub during the season of bloom. They possess, however, a very marked spicy fragrance. A conspicuous feature of the blossoms of this thorn is the calyx with its long, narrow, leaflike, sharply

serrate divisions about twice the length of the white petals. The thorns are slender, straight and rigid, running from 1.5 to 1.75 inches in length.

The fruit ripens about the middle of October and at maturity falls with the slightest touch. These fruits are smooth, globose, 0.5 inch or more in diameter, and orange-red in color. The flesh is firm, rather juicy, and with a spicy odor and taste. The prominent calyx adds noticeably to the appearance of the pretty fruits. This little thorn is extremely attractive in autumn when sprinkled with the rather large orange-red haws.

CRATAEGUS COLLINA Chapman. This *Crataegus* is a common species at Thompson's Mills. It is seen at its best in open fields, where it sometimes becomes a much branched, round-headed tree 15 to 18 feet or more in height.

The leaves are somewhat coarse in texture, dark, dull green in color, mostly obovate and doubly serrate. The young twigs are somewhat pubescent. Thorns are numerous, stout, and about 1.5 inches long.

This *Crataegus* blossoms several weeks earlier than the other species mentioned in this paper, all of which are in bloom about May 1. On this date in 1910, some trees of *C. collina* were loaded with haws 0.25 inch or more in diameter, green or slightly tinged with red on one side. At maturity the fruits are large, globose, and red in color. *Crataegus collina* is one of the largest and most ornamental thorns at Thompson's Mills.

CRATAEGUS BEADLEI Ashe. This *Crataegus* is fairly common locally at Thompson's Mills. It is especially common on the wooded pasture hillside mentioned earlier in this paper. Here it is rather evenly distributed as underbrush beneath the heavy pines, and attains a height of from 8 to 10 feet. The branches are somewhat tortuous and irregular in their manner of growth, producing an open-headed, straggling bush.

The leaves are thin, delicate, light green in color, and quickly wilt when a branch is cut. The compact corymbs are from 1 to 1.5 inches across, and include from four to six white showy blossoms. These corymbs are scattered along the slender branches, and rarely include more than five blossoms, which fill the air in the vicinity with a heavy, sweet, pear blossom fragrance. The blossoms are from 0.5 to 0.75 inches in diameter.

The duration of the blossoming period varies considerably in different individuals. Some bushes open their blossoms almost simultaneously. Others blossom more slowly for a considerable interval so that the intermingling of the buds and blossoms pro-

FIGURE 3. *Crataegus Beadlei* Ashe, in bloom.

duces a very pleasing effect. The heavy fragrance of these blossoms attracts great numbers of bees and wasps. The fruit is ripened about the middle of October, and readily falls when ripe. These fruits are oval to globular, somewhat irregular in outline,

and dull orange-red in color. At Thompson's Mills, this *Crataegus* shows considerable variation in size of thorns, blossoms, fruits, etc.

Crataegus Beadlei occurs mainly in woods at Thompson's Mills. This thorn was first described in 1900 by Ashe, who found it at Salisbury, North Carolina.* The Thompson's Mills record of this thorn makes it an addition to the flora of Georgia.

In many respects the species of *Crataegus* are among our

FIGURE 4. *Crataegus Beadlei* Ashe, showing leaves and flowers; somewhat reduced.

hardiest and most ornamental native shrubs and trees, and they deserve to occupy a prominent place in the adornment of all home grounds and parks. These shrubs in most instances become strikingly lovely during the season of bloom. A number of species are worthy of cultivation for their foliage effects alone. In autumn the abundant orange and red haws again render most species very attractive.

*See "New North American plants—Some new species of *Crataegus*" in Bulletin 175 of the North Carolina College of Agriculture and Mechanic Arts, 1900.

At Thompson's Mills on the estate of the J. N. Thompson Co., several fine individuals of *C. collina* have by good foresight been allowed to grow until they have become especially fine, large, flourishing trees.

Crataegus collina is the finest species in this region, and in open, favorable situations it becomes a clean, compact, symmetrical round-headed tree, the heavy foliage of which affords an abundance of shade.

In this region *Crataegus spathulata* has few peers among the wild, native ornamentals. The dark green leaves of *C. Crus-galli*, which are as glossy as if they had been varnished, are an especially attractive feature of this thorn. The smaller *C. Beadlei* is most attractive in springtime when covered with the numerous white blossoms. With a little care the species of *Crataegus* can be readily transplanted, and may be trained to become very graceful and shapely shrubs or trees. It is rather to be deplored that we so often neglect our wild, native ornamental thorns for something foreign and oftentimes not nearly so hardy or so pleasing to the eye.

BUREAU OF PLANT INDUSTRY,
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Panama mosses

R. S. Williams

The following rather brief list of mosses is made up of species collected along the Canal Zone by Dr. Marshall A. Howe, in the latter part of 1909 and early in 1910, and by the author, about a year previously, chiefly in the vicinity of Penonomé, some hundred miles west of the zone, and also about Cana, nearly the same distance east of the zone, in the province of Darien.

Of the 39 species listed, 32 occur in South America, 9 species are found in both North and South America, and 6 species, I believe, are known only from Central America.

Dicranella Hilariana (Mont.) Mitt. *Howe*, Culebra, Dec. 1909.

I believe this to be a widely distributed species occurring throughout northern South America, the West Indies, Mexico, and the southern United States. It includes numerous slight varieties that have been given specific names, among others *D. tenuirostris* (Kunze) Mitt., *D. Liebmanniana* (C. M.) Besch., *D. mexicana* (Besch.) Jaeg. and *D. trematodontifolia* (C. M.) Par.

Dicranella Perrotettii (Mont.) Mitt. *Williams 1058*, Cana, on earth along ditches, April.

Holomitrium crispulum Mart. *Williams 1059*, Cana, on trees at 900 m., April.

Leucobryum giganteum C. M. *Williams 1061*, Cana, at 1200 to 1800 m.

Octoblepharum albidum (L.) Hedw. *Howe*, Taboga Island, and *Williams 1048*, Penonomé.

Fissidens polypodioides (Sw.) Hedw. *Williams 1080*, Cana, 1800 m. alt.

Syrrhopodon brachysteloides C. M. *Williams 1052*, Marraganti, at head of Gulf of San Miguel, on trees at 15 m. elevation, April, 1908.

Syrrhopodon Bernoullii C. M. *Williams 1046*, near Cana, 1200 to 1800 m. elevation, April, 1908.

HYOPHILA OERSTEDIANA C.M. *Howe*, Taboga Island, on rock, Dec. 1909. This determination is from description by C. Mueller in Syn. Musc. **2**: 622. The type specimens were from Nicaragua.

MACROMITRIUM APICULATUM Hook. *Howe*, Gatun and Ahorca Lagarto, Jan. 1910.

MACROMITRIUM MUCRONIFOLIUM Hook. & Grev. *Williams 1066*, on trees near Penonomé at 600 m., March, 1908.

Macromitrium flavopilosum sp. nov.

Pseudoautoicous: in rather loose mats with bare or more or less tomentose creeping stems and rather distant, short, robust, often divided branches up to 2 cm. high, with crowded, spreading-flexuous, slightly undulate leaves; upper leaves 8 to 9 mm. long, narrowly lanceolate, smooth on both sides, serrulate on margin in upper half, gradually tapering into a yellowish, nearly straight, smooth hair point, slightly denticulate at apex and from one third to two thirds as long as blade; leaf cells narrow and elongate throughout with thickened walls, in rather straight rows, without furrows between from base to above the middle, in upper leaf scarcely in rows; perichaetial leaves scarcely differing from stem leaves: seta smooth, about 1 cm. high; capsule scarcely 2 mm. long, smooth, oval; lid convex, with slender, straight beak two thirds the length of capsule; peristome double, papillose, reddish brown, the outer a low cylinder with irregular margin, the inner a little higher than the outer with margin more deeply incised; calyptra without hairs, lacerate below, somewhat rough at apex; spores rough, up to 30μ in diameter.

TYPE LOCALITY: Cana, Prov. Darien, Panama. *Williams 1063*.

A species much like *M. ulophyllum* in habit but leaves less undulate above, without a distinct border and median cells not in oblique rows.

PHILONOTIS SPHAERICARPA (Sw.) Brid. *Howe*, Culebra and Taboga Island, Dec. 1909. This is *P. nanodendra* C. M.

BRYUM CORONATUM Schwaegr. *Howe*, Culebra and Taboga Island; and *Williams*, Penonomé, in cultivated fields.

RHIZOGONIUM SPINIFORME (L.) Bruch. *Williams 1047*, Cana, at 1200 to 1800 m.

PSEUDOCRYPHAEA FLAGELLIFERA (Brid.) E. G. Britton. *Williams 1076*, Cana.

LEUCODONIOPSIS PLICATA Ren. & Card. *Williams 1068*, Cana at 650 m.

PRIONODON DENSUS (Sw.) C.M. *Williams 1062*, Cana.

ORTHOSTICHOPSIS TETRAGONA (Sw.) Broth. *Williams 1069*, Cana at 900 to 1200 m. elevation and *1078*, Marraganti, 15 to 30 m. elevation.

LINDIGIA ACICULATA (Tayl.) Jacq. *Williams 1055*, Cana.

METEORIOPSIS RECURVIFOLIA (Hornsch.) Broth. *Williams 1067*, Cana at about 90 m.

METEORIOPSIS PATULA (Sw.) Broth. *Williams 1079*, Marraganti, 15 to 30 m. elevation.

PHYLLOGONIUM FULGENS (Sw.) Brid. *Williams 1044*, Cana, 1200 to 1800 m. alt. A slender form, var. *gracile* Ren. & Card.

PHYLLOGONIUM VISCOSUM (Palis.)Mitt. *Williams 1045*, Cana at 1500 to 1800 m.

NECKERA UNDULATA (Palis.) Hedw. *Williams 1050*, Marraganti, 30 to 60 m. elevation, April, 1908.

NECKERA DISTICHA Hedw. *Williams 1049*, Marraganti, 30 to 60 m. elevation.

POROTRICHUM COBANENSE C.M. *Williams 1053*, Cana, April, 1908.

PILOTRICHUM AMAZONUM Mitt. *Williams 1105*, Marraganti, April, 1908.

These seem to be the only specimens obtained of this species since the type was collected by Spruce on the Amazon.

Stereophyllum Howei sp. nov.

Autoicous: antheridial buds on stem near the fertile flowers, about 0.5 mm. high, the perigonial leaves ovate, more or less acutely pointed and serrulate with costa often faint, enclosing 4 or 5 antheridia without paraphyses; in thin mats with creeping, somewhat branching stems mostly without radicles, about 1 cm. long; stem leaves mostly 1 mm. long and 0.4 mm. wide, much compressed, inequilateral, elongate-ovate or somewhat lingulate, obtusely or sometimes acutely pointed, smooth on both surfaces, serrulate one half their length or more with flat margins except on narrower side in basal part; costa extending to a little above the middle; leaf cells mostly narrowly linear and somewhat vermicular, the median about 4μ wide and 40 to 80μ long, the alar sometimes scarcely differentiated or of pale, rectangular to nearly square cells, mostly not very numerous; perichaetial leaves

ovate-lanceolate, up to 1 mm. long, serrulate often for three fourths their length, faintly costate in lower half: seta 10 to 12 mm. long; capsule oval, scarcely 1 mm. long, the lid highly conical with short beak rather over one half capsule in length: annulus evidently wanting; outer teeth of peristome with highly projecting lamellae on inner side above the middle, the inner peristome a little shorter than outer, punctate, with lanceolate, keeled, solid segments and stout, solitary cilia; spores smooth, about 16μ in diameter.

TYPE LOCALITY: Taboga Island, Panama Bay.

Collected on a shaded rock by M. A. Howe, Dec. 13, 1909.

This species evidently belongs to the group under G of section 2 of the genus as given by Brotherus in the Engler & Prantl, Natürliche Pflanzenfamilien.

CYCLODICTYON LIEBMANNI Schpr. *Williams 1070 and 1075*, Cana, 1200 to 1800 m., April, 1908.

CALLICOSTELLA PALLIDA (C. M.) Jaeg. *Williams 1064*, Cana, 1200 to 1800 m.

LEPIDOPILUM BREVIPES Mitt. *Williams 1057*, Cana, on trees at 900 m., in fine fruit, April 20, 1908. This seems to be the only other collection of this species since the type was collected by Spruce on the Amazon at about the same altitude.

LEPIDOPILUM POLYTRICHOIDES (Hedw.) Brid. *Williams 1056*, Cana at 200 m., in fine fruit, April 20, 1908. Growing in spray of waterfall.

LEPIDOPILUM SEMILAEVE Mitt. *Williams 1054*, Cana, on trees at 1200 to 1500 m. alt.; collected also above Penonomé, *1065*, on branches; in fine fruit, March and April, 1908.

HYPOPTERYGIUM TAMARISCI (Sw.) Brid. *Williams 1053*, Cana, at 1800 m.

TAXITHELIUM PLANUM (Brid.) Mitt. *Howe*, Gatun and Mt. Hope, Jan. 1910.

TRICHOSTELIUM FLUVIALE (Mitt.) Jaeg. *Howe*, Mt. Hope.

SEMATOPHYLLUM PUNGENS (Sw.) Mitt. *Williams 1071*, above Penonomé at about 600 m. ele., and *1072*, Cana at 1200 to 1800 m.

RHYNCHOSTEGIUM SCARIOSUM (Tayl.) Jaeg. *Williams 1074*, Cana, on bark at 1200 to 1800 m.

NEW YORK BOTANICAL GARDEN,
BRONX PARK, NEW YORK CITY

INDEX TO AMERICAN BOTANICAL LITERATURE

(1910)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

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